REMARKS

This amendment, filed in reply to the Office Action dated June 15, 2007, is believed to be fully responsive to each point of the rejection raised therein. Accordingly, favorable reconsideration and allowance of the subject application are respectfully requested.

Claims 21-40 are all the claims pending in the application.

Rejection under 35 U.S.C. § 103

Claims 21-24, and 26-40 are rejected under 35 U.S.C. § 102 (b) as being anticipated by Park et al. (U.S. Patent No. 7,157,359; hereinafter "Park"). Applicant respectfully traverses this rejection.

Applicant respectfully submits that Park fails to disclosed a semiconductor as described and claimed in claim 21. Claim 21 recites:

> A semiconductor device stacked a gate insulating film and a gate electrode in **this order on a silicon substrate**; wherein
>
> said gate insulating film comprises a nitrogen containing high-dielectric-constant insulating film which has a structure in which nitrogen is introduced into metal oxide or metal silicate; and
>
> the nitrogen concentration in said nitrogen containing high-dielectric-constant insulating film has a distribution in the direction of the film thickness; and
>
> **a position at which the nitrogen concentration in said nitrogen containing high-dielectric-constant insulating film reaches a maximum in the direction of the film thickness is present in a region at a distance from the silicon substrate.**

In contrast, Park teaches a semiconductor device including a metal gate. The semiconductor comprising substrate (1), isolation film (2), a gate insulating film (3), a

barrier metal film (4), metal film (5), hard mask film 6. Park teaches that the gate insulating film 3 is made of a silicon oxide having thickness of 10 Å through 40 Å, see col. 3, lines 25-28. Park further teaches that a high dielectric constant insulating film instead of silicon oxide film may be used as the gate insulating film (3), see figure 3C. Also disclosed by Park is that "before the high dielectric constant insulating film is deposited, an ultra thin (e.g. 3 Å to 30 Å) silicon oxide film may be formed.

The Examiner relied mainly on figure 3C and col. 3, lines 39-46 to support the rejection of the claim. However, after careful reading and study of the cited portion and the figure, Applicant respectfully submits that the semiconductor of Park differs from the claimed invention in many aspects. First, Applicant claims a semiconductor device stacked a gate insulating film and a gate electrode in particular order as described in this claim 21. Looking at figure 3B and 3C, it is clear that the semiconductor of Park does not have the same order as described in claim 21. Second, Applicant claims that the "nitrogen containing high-dielectric-constant insulating film reaches a maximum in the direction of the film thickness is present in a region at a distance from the silicon substrate." Park discloses that "the high dielectric constant insulating film may be subject to an annealing process under nitrogen, col. 3, line 43, but Park does not teach that a maximum concentration of the nitrogen containing high-dielectric-constant at particular distance from the silicon substrate. Third, the Examiner indicated layer 4 and 10 in figure 3C as gate insulating film. Applicant respectfully submits the layer 4 and 10 represent a barrier metal film formed of metal such as TiN, TiAlN, TaN, MoN, WN and

mixtures thereof and does not represent the gate insulating film. For at least these reasons, Applicant respectfully requests the withdrawal of the rejection and earnestly solicits the allowance to the claims.

Claims 22-24, 26-28 are patentable at least by virtue of their dependency on claim 21 and for analogous rationale presented above.

As per claim 29, in addition to the argument presented above regarding claim 21, Park does not disclose "a nitrogen atom in said nitrogen containing high-dielectric-constant insulating film selectively bonds with a silicon atom in metal silicate." The Examiner relied on figure 3C, item label 4 to support the rejection. Applicant respectfully submits that Park does not teach or suggest the introduction of nitrogen into item 4 as purported by the Examiner. Park does appear to teach subjecting the insulating film to an annealing process using a rapid thermal process under nitrogen; however, Park fails to teach that the nitrogen atom in said nitrogen containing high-dielectric-constant insulating film **selectively bonds** with a silicon atom in metal silicate. Therefore, Applicant respectfully submits that Park does not anticipate the claimed invention and kindly requests the withdrawal of the rejection.

Claims 30-33 are patentable at least by virtue of their dependency on claim 29 and for analogous rationale presented above.

As per claim 34, in addition to the arguments presented above regarding claim 21, the Applicant further submits that Park fails to at least teach that "the composition of said nitrogen containing high-dielectric-constant insulating film **continuously varies in the direction of the**

film thickness and **the silicon concentration has a minimum value in the middle section lying between a silicon substrate side interface of said nitrogen containing high-dielectric-constant insulating film and a gate electrode side interface thereof**; and **nitrogen is introduced only into a region lying between the position at which the silicon concentration has the minimum value and said gate electrode side interface."** The Examiner cites figure 3 C, label (1) for support for the rejection. After careful review of the drawing, Applicant submits that Park does not teach the highlighted features. Therefore, Applicant respectfully requests the withdrawal of the rejection. If the Examiner insists on maintaining the rejection, Applicant respectfully requests that the Examiner provides a full detailed explanation pointing out exactly where Park discloses those features highlighted above. Alternatively, the Applicant respectfully requests the allowance of the claims.

Claims 35 and 36 are patentable at least by virtue of their dependency on claim 34 and for analogous rationale presented above.

As per claim 37, in addition to the arguments presented above regarding claim 21, the Applicant further submits that Park fails to at least teach that "said gate insulating film has a layered structure having, from the silicon substrate side, a first silicon oxide film, a metal oxide film or a metal silicate film and a second silicon oxide film; and **only the second silicon oxide film has a structure in which nitrogen is introduced into silicon oxide**." The Examiner asserts that "only the second silicon oxide film (6, example figure 3C) has a structure in which nitrogen is introduced into silicon oxide." Citing col. 3, lines 39-46. The Applicant disagrees and respectfully submits that Park teaches that both isolating film 3 and the hard mask film 6 has

silicon oxide. See col. 3, line 25-26 and col. 4, lines 25-27. Therefore, Applicant respectfully submits that Park does not anticipate the claims invention as described in claim 34. For at least these reasons, the Applicant respectfully requests the withdrawal of the rejection and earnestly solicits the allowance of the subject application.

Claims 38 and 39 are patentable at least by virtue of their dependency on claim 37 and for analogous rationale presented above.

As per claim 40, Applicant respectfully submits that this claim is patentable for analogous reasons set forth above regarding claim 21.

Rejection under 35 U.S.C. § 103

Claim 25 is rejected under 35 U.S.C. § 103 (a) as being unpatentable over Park. Applicant respectfully traverses this rejection.

Applicant submits that Park does not render the claimed invention obvious because Park fails to teach or suggest the claimed invention as recited in claim 21 as traverse above. Thus, claim 25 is patentable at least by virtue of its dependency on claim 21. Moreover, Park does not teach that "the nitrogen concentration on a silicon substrate side interface of said gate insulting film is less than 3 atomic %."

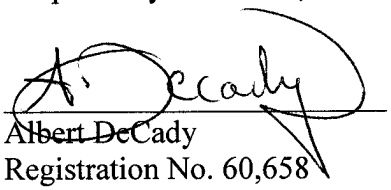
Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the

Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



Albert DeCady
Registration No. 60,658

SUGHRUE MION, PLLC
Telephone: (202) 293-7060
Facsimile: (202) 293-7860

WASHINGTON OFFICE
23373
CUSTOMER NUMBER

Date: October 15, 2007